VI. STATE AGENCIES' GENERAL SYSTEM INFORMATION

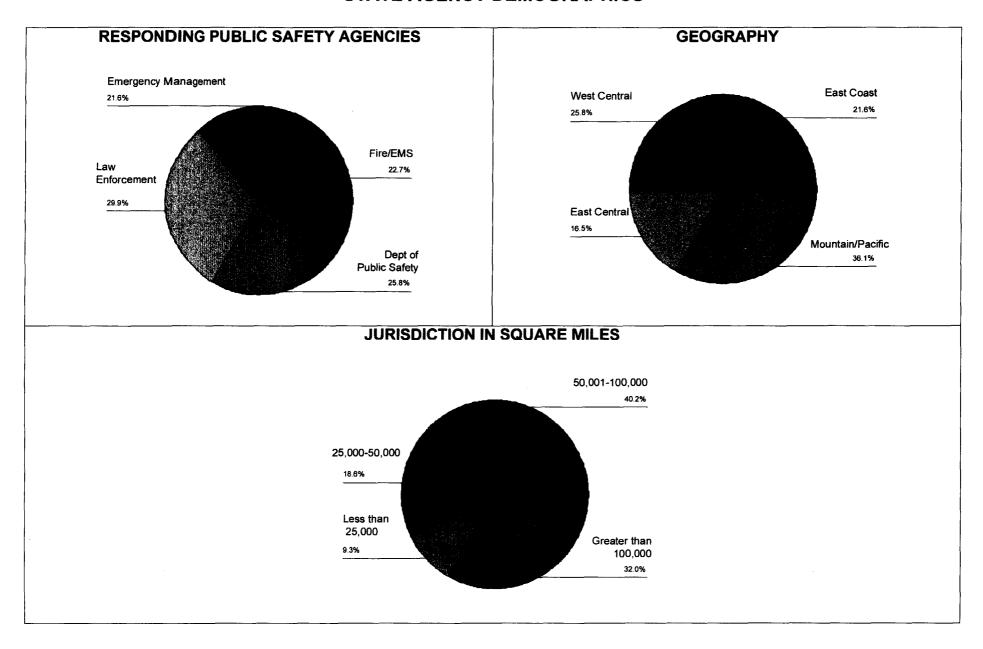
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State Agencies' General Systems Information...

THIS SECTION SUMMARIZES STATE AGENCY RESPONDENTS' GENERAL SYSTEMS INFORMATION

- This section covers the following set of system information:
 - State Agency Demographics
 - System Type
 - Operating Frequency
 - Shared Systems
 - Additional Types of Communications Supported

STATE AGENCY DEMOGRAPHICS



State Agencies' General Systems Information...Demographics...

SURVEY RESPONSES FROM STATE PUBLIC SAFETY AGENCIES WERE CATEGORIZED BY MISSION, GEOGRAPHY, AND COVERAGE AREA

• Responding state agencies are classified into four mission types with the following distribution:

-	Law Enforcement	29.9%
-	Department of Public Safety	25.8%
-	Fire/EMS	22.7%
-	Emergency Management	21.6%

 Responding state agencies were grouped into four geographic regions that were established by combining the nine United States census regions:

-	East Central (East North Central/East South Central)	16.5%
-	East Coast (Mid-Atlantic/South Atlantic/New England)	21.5%
_	Mountain/Pacific	36.1%
-	West Central (West North Central/ West South Central)	25.8%

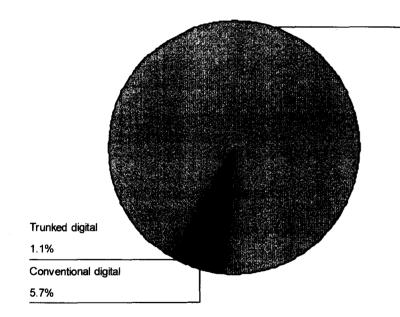
• State agencies' coverage area was determined by grouping the known square mileage of each state into the following four groups:

-	Less than 25,000 square miles	9.3%
-	25,000 to 50,000 square miles	18.6%
-	50,000 to 100,000 square miles	40.2%
_	Greater than 100,000 square miles	32.0%

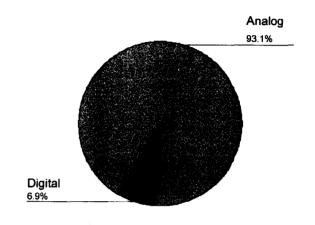
SYSTEM TYPE DISTRIBUTION FOR ALL RESPONDING STATE AGENCIES

Conventional analog

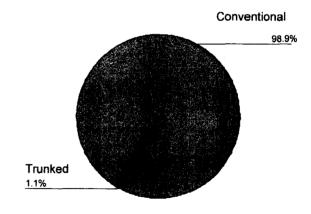
93.1%



ANALOG VERSUS DIGITAL DISTRIBUTION



CONVENTIONAL VERSUS TRUNKED DISTRIBUTION



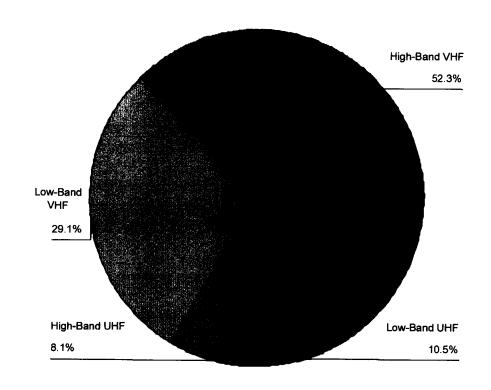
State Agencies' General Systems Information...System Type...

STATE AGENCIES, LIKE LOCAL AGENCIES, WILL NEED TO DEDICATE SIGNIFICANT FINANCIAL RESOURCES TO MODERNIZATION IF THEY WISH TO MIGRATE TO DIGITAL SYSTEMS

- A smaller percentage of state agencies than local agencies use digital technology
 - Approximately 7% of responding state agencies operate digital systems
 - Of those with digital systems, 82.6% operate conventional systems and 17.4% operate trunked systems
 - Just over 93% of all responding state agencies report operating analog systems
- Responding state agencies have not made large-scale moves to replace conventional analog technology
 - Over 80% of responding state agencies within each mission type currently operate conventional analog systems
 - All responding state emergency management agencies indicate use of conventional analog systems
 - Approximately 10% of state law enforcement agencies and state departments of public safety indicated that they now use conventional digital technology
- Only 1.1% of all responding state agencies report using trunked systems, all of which are also digital systems
 - Only state fire/EMS agencies reported that they use trunked technology

Note: A chart showing the distribution of system types by agency mission is included in Appendix D

OVERALL OPERATING FREQUENCY DISTRIBUTION FOR RESPONDING STATE AGENCIES



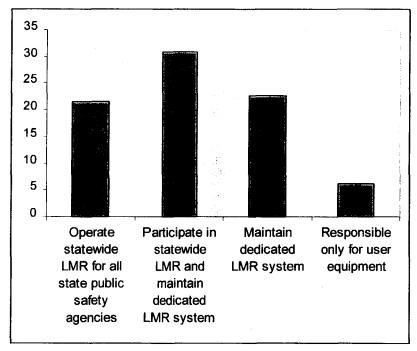
State Agencies' General Systems Information...Operating Frequency...

A MAJORITY OF STATE AGENCIES CONTINUE TO OPERATE THEIR LMR SYSTEMS IN HIGH-BAND VHF

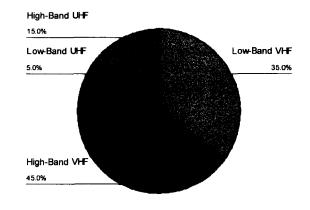
- Survey responses show similar percentages of state and local agencies operating in the High-Band VHF and 800 MHz bands
 - 52.3% of state agencies indicate High-Band VHF operations while only 8.1% operate in 800 MHz
 - A significant number (29.1%) of responding state agencies are operating in low-band VHF
- The mission of respective state agencies does not appear to impact thier selection of a frequency band, although the following cases were noted:
 - Nearly 80% of responding state law enforcement agencies operate in either Low-Band or High-Band VHF
 - State fire/EMS agencies have the highest percentage (14.3%) of 800 MHz systems
 - State emergency management agencies did not appear to operate any 800 MHz systems
- · Operating frequency varies among responding state agencies from differing geographic regions
 - In both the Mountain/Pacific and the West Central regions, over 60% of respondents operate in high-band VHF
 - The East Coast region operates primarily (47.1%) in Low-Band VHF
 - The East Central region has the highest percentage of responding state agencies (14.3%) operating in the 800 MHz band
- Survey responses indicate that state agencies in larger jurisdictions tend to operate in the High-Band VHF
 - Only 14.3% of responding state agencies from jurisdictions less than 25,000 square miles operate on a High-Band VHF, while over 65% of state respondents covering over 100,000 square miles operate in High-Band VHF
 - 14.3% of the state respondents with jurisdictions covering less than 25,000 square miles operate in the 800 MHz band, no respondents in jurisdictions grater than 100,000 square miles operate in the 800 MHz band

Note: Charts showing the distribution of operating frequency by agency mission, geographic region, and jurisdiction size are included in Appendix D

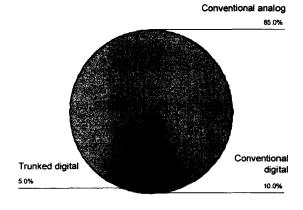
DISTRIBUTION OF STATE AGENCIES' LMR RESPONSIBILITY



OPERATING FREQUENCY OF RESPONDING AGENCIES THAT OPERATE A STATEWIDE LMR SYSTEM



SYSTEM TYPE OF RESPONDING STATE AGENCIES THAT OPERATE A STATEWIDE LMR SYSTEM

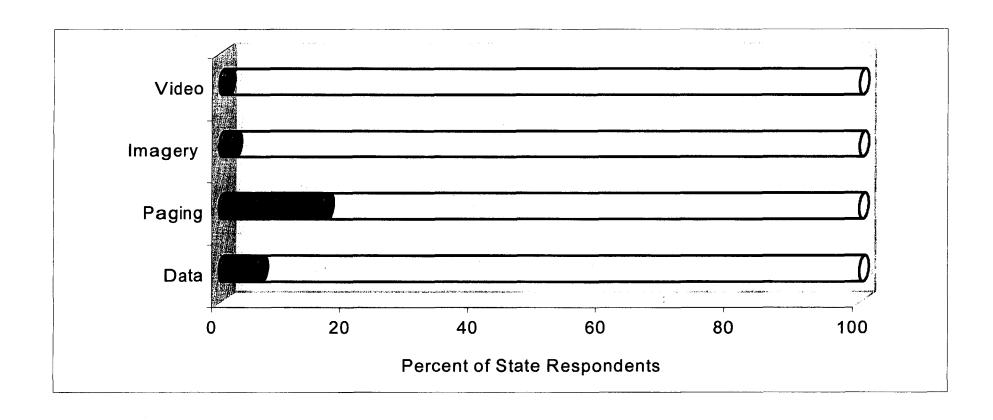


State Agencies' General System Information... Sharing...

WIDESPREAD SHARING OF LMR SYSTEMS DOES NOT APPEAR TO EXIST AT THE STATE LEVEL

- 27% of all state respondents indicate that they operate and maintain a statewide LMR system for all state public safety agencies
- A majority (37%) of state survey respondents participate in state systems but also continue to operate their own systems
 - 28% of responding state agencies maintain their own systems and do not participate in a broader system
 - 8% of responding state agencies indicate that they are responsible for only their user equipment (these agencies may have partnerships with either private service providers or other public safety agencies who own and maintain the LMR system)
- Many (45%) of those who operate statewide systems for all public safety agencies operate in High-Band VHF
 - A significant portion (over 30%) operate in Low-Band VHF
 - 15% operate in the 800 MHz band
- As with local systems, most of the shared statewide systems are conventional analog
 - Over 80% of the shared state systems are analog
 - 15% of the shared systems are digital, and a third of those are trunked

PERCENTAGE OF STATE RESPONDENTS WHO INDICATE SUPPORT FOR ADDITIONAL TYPES OF COMMUNICATIONS



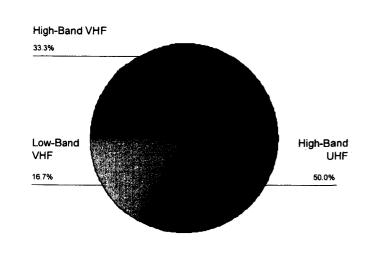
State Agencies' General System Information...Additional Types of Communications Supported...

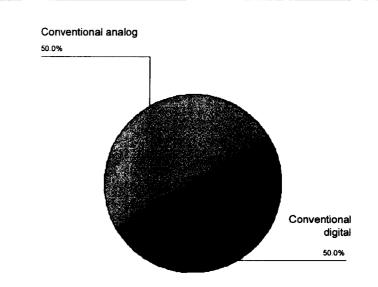
IT APPEARS RESPONDING STATE AGENCIES ARE BEGINNING TO IMPLEMENT MORE ADVANCED TECHNOLOGIES AND CAPABILITIES

- The use of paging and data technology is becoming more prominent among state public safety agencies
 - Nearly 20% of responding state agencies have paging capability
 - Only about 6% of state respondents currently use their system to support data communications
- Some state public safety agencies did not indicate use of any additional types of communications
 - Responding state fire/EMS agencies indicate no use of either paging or data communications
 - Responding state departments of public safety did not report any use of data
- As with local public safety agencies, responding state agencies use of video and imagery technology is nominal
 - 2.1% of state survey respondents use their system to support imagery transmission
 - Only 1% of responding state agencies report using their LMR system for video transmission

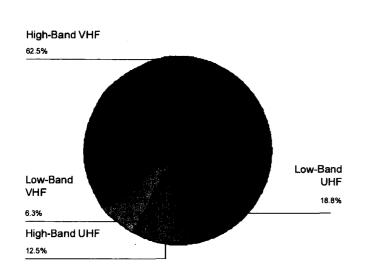
Note: Charts comparing paging and data capabilities by agency's mission are included in Appendix D

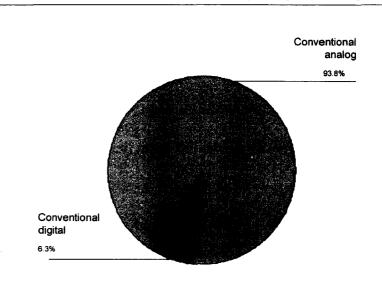
OPERATING FREQUENCIES AND SYSTEM TYPES OF STATE AGENCIES THAT SUPPORT DATA





OPERATING FREQUENCIES AND SYSTEM TYPES OF STATE AGENCIES THAT SUPPORT PAGING





State Agencies' General Systems Information...Additional Types of Communications Supported...

RESPONDING STATE AGENCIES USING MORE ADVANCED COMMUNICATIONS CAPABILITIES ALSO TEND TO OPERATE A MORE UPDATED LMR INFRASTRUCTURE

- State respondents who indicate they operate data-capable systems also tend to have more a sophisticated LMR infrastructure
 - A significant percentage (50%) of responding state agencies with data-capable systems operate in the 800 MHz band
 - Additionally, 50% of the responding state agencies with data-capable systems indicate that their systems are digital
- State agencies appear to operate more mobile data computers (MDC's) than mobile data terminals (MDT's)
 - Twice the number of state law enforcement agencies use MDC's as MDT's
 - Three times the number of state emergency management agencies use MDC's as MDT's
- Similar to local agencies, survey responses indicate that the LMR infrastructure characteristics of state agencies supporting paging communications are more reflective of the overall public safety community
 - Of those state respondents with paging systems, 62.5% operate in High-Band VHF
 - 93.8% of respondents with paging systems operate conventional analog systems

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VII. STATE AGENCIES' USER EQUIPMENT INFORMATION

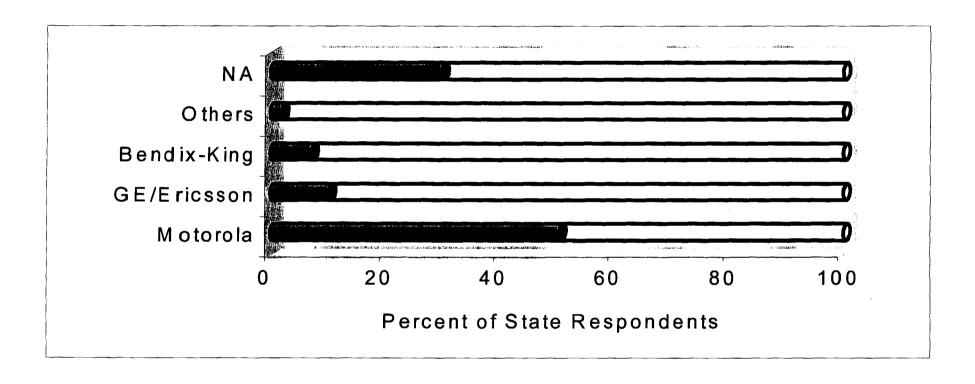
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State Agencies' User Equipment Information...

THIS SECTION SUMMARIZES STATE AGENCY RESPONDENTS' USER EQUIPMENT INFORMATION

- This section covers the following information:
 - Portable Radio Vendors
 - Portable Radio Types
 - Portable Radio Security
 - Mobile Radio Vendors
 - Mobile Radio Types
 - Mobile Radio Security

DISTRIBUTION OF PORTABLE RADIO VENDORS (STATE RESPONDENTS)



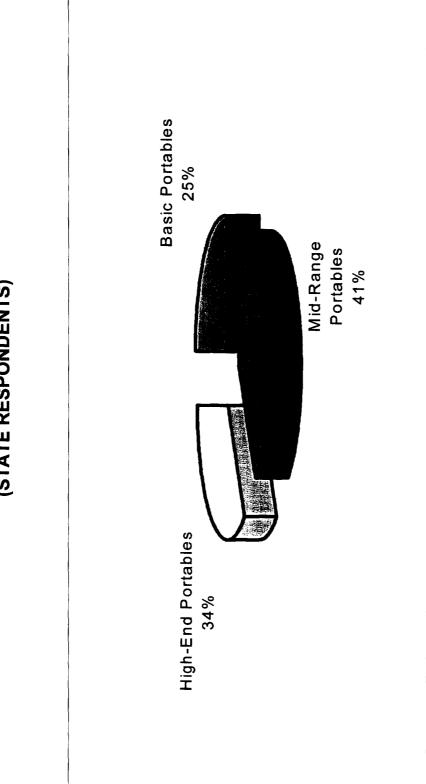
Note: "NA (Not Available)" represents those respondents who did not indicate portable radio vendors "Other" includes ICOM and Midland

State Agencies' User Equipment Information...Portable Radio Vendors...

THE STATE PUBLIC SAFETY PORTABLE RADIO MARKET, LIKE THE LOCAL MARKET, IS PRIMARILY SUPPLIED BY ONE VENDOR

- There may be an opportunity to reduce portable radio costs through increased market competition
 - Motorola is the primary portable radio vendor for 50.5% of responding state agencies
 - Ericsson is the second largest portable radio vendor, but has slightly over 10% market share
 - No state respondents indicated that they use Kenwood portable radios; instead, Bendix-King is the third-largest provider of portable radios (7.2%) to responding state agencies
- State agencies indicated that they only use two other portable radio vendors
 - These vendors do not have a significant market share (2%) and do not appear to offer competition to the three largest portable radio vendors
- Nearly 30% of state survey respondents did not indicate which vendor supplied their portable radios
 - The large percentage of those who did not answer could significantly change the market analysis
 - The vendor section of the LMR Equipment and Infrastructure Survey was optional

DISTRIBUTION OF THE TYPES OF PORTABLE RADIOS (STATE RESPONDENTS)



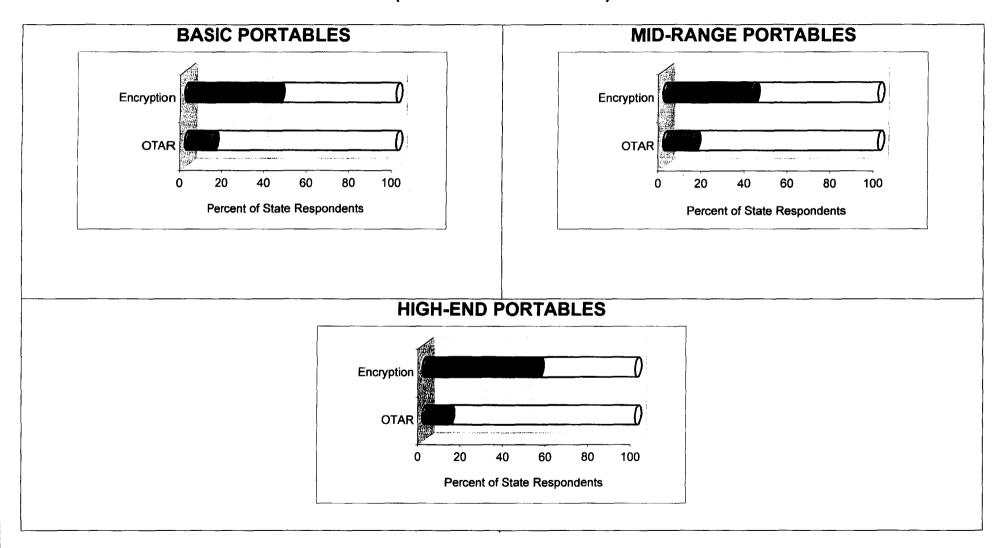
State Agencies' User Equipment Information...Portable Radio Types...

RESPONDING STATE AGENCIES APPEAR TO BE USING MORE HIGH-END PORTABLE RADIOS THAN THEIR LOCAL COUNTERPARTS

- The cost study activity grouped the types of portable radios into three categories: basic, mid-range, and high-end
 - Descriptions of these three categories are included on page IV-3
- The percentage of state respondents that operate mid-range portable radios is significantly lower than the percentage of local respondents operating mid-range radios
 - The percentage decrease in state agency use of mid-range radios is offset by an significantly higher percent (34%) indicating that they operate high-end portable radios
 - The percentage of state respondents (25%) indicating use of basic portable radios is also higher than for local respondents
- The mission of responding state agencies appears to effect the level of sophistication of their portable radios
 - State law enforcement and emergency management agencies have a fairly equal distribution between basic, mid-range, and high-end portable radios
 - State departments of public safety operate very few high-end radios (2.4%); however, they operate nearly the same percentages of basic and mid-range radios

Note: A chart showing the types of portable radios used by mission is included in Appendix E

OVER THE AIR REKEYING (OTAR) AND ENCRYPTION ON PORTABLE RADIOS (STATE RESPONDENTS)



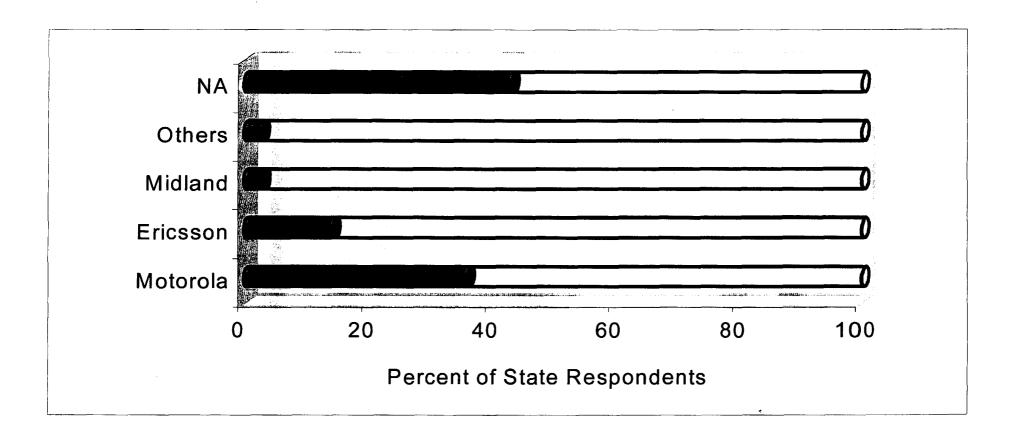
State Agencies' User Equipment Information...Portable Radio Security...

RESPONDING STATE AGENCIES ALSO APPEAR TO BE ADDING ADDITIONAL SECURITY FEATURES TO MANY OF THEIR RADIOS

- As with local survey respondents, the use of encrypted radios are becoming necessary for state respondents to effectively perform their mission
 - Over 40% of respondents with each type of radio (basic, mid-range, high-end) indicate that their radios have encryption capabilities
 - Nearly 60% of state respondents' high-end portables are encryption-capable
 - State law enforcement and emergency management appear to have the largest percentages of encrypted radios
 - With approximately 20% of their radios encryption-capable, state fire/EMS agencies appear to use the least amount of encrypted communication
- Responding state agencies appear to be using equivalent percentages of OTAR regardless of the level of sophistication of their portable radios
 - State departments of public safety operate the largest percentage of OTAR-capable radios
 - Over 50% of state departments of public safety that have encryption-capable radios also have OTAR-capable radios
 - State fire agencies did not indicate any use of OTAR

Note: Charts comparing the use of OTAR and encryption technology by agency mission are included in Appendix E

DISTRIBUTION OF MOBILE RADIO VENDORS (STATE RESPONDENTS)



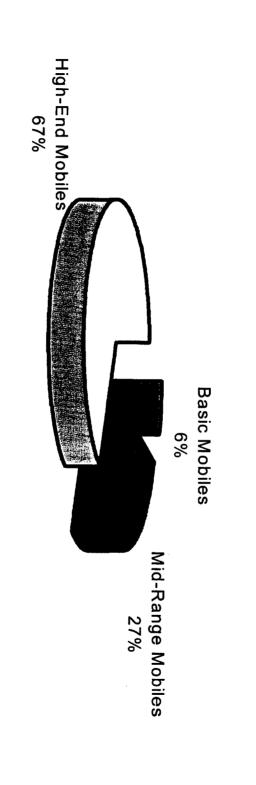
Note: "NA (Not Available)" represents those respondents who did not indicate mobile radio vendors. "Other" includes Kenwood, Syntor, and Teletec

State Agencies' User Equipment Information... Mobile Radio Vendors...

THE LARGE NUMBER OF RESPONDENTS WHO DID NOT INDICATE A MOBILE RADIO VENDOR MAKE IT DIFFICULT TO DRAW ANY SIGNIFICANT CONCLUSIONS ABOUT THE STATE PUBLIC SAFETY MOBILE RADIO MARKET

- Over 40% of the state agency respondents did not indicate which vendor supplied their mobile radios
 - The vendor section of the LMR Equipment and Infrastructure Survey was optional
- Among the state agencies who provided their mobile radio vendors, the market appeared to mirror the state's portable radio market
 - Motorola is the mobile radio vendor for more than 36% of state respondents
 - Ericsson is the second largest mobile radio vendor with 14.4% of market share of state respondents
 - Midland is the third largest provider of mobile radios (3.1%)
- Many of the responding state agencies use the same mobile vendor as portable vendor
 - 90% of the state respondents that use Ericsson portable radios also use Ericsson mobile radios
 - 65.3% of the state respondents that use Motorola portable radios also use Motorola mobile radios
 - None of the respondents that use Bendix-King portable radios use Bendix-King mobile radios; Bendix-King does not appear to manufacture mobile radios

DISTRIBUTION OF TYPES OF MOBILE RADIOS (STATE RESPONDENTS)



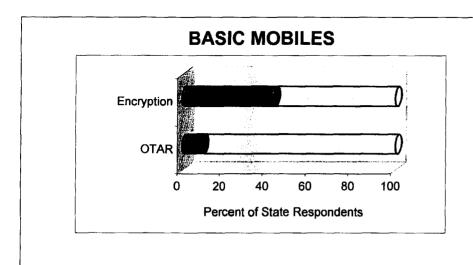
State Agencies' User Equipment Information... Mobile Radio Types...

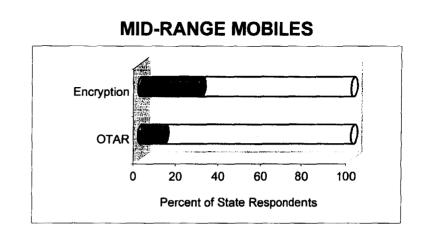
RESPONDING STATE AGENCIES INDICATE THAT THEY USE A SIGNIFICANT NUMBER OF HIGH-END MOBILE RADIOS

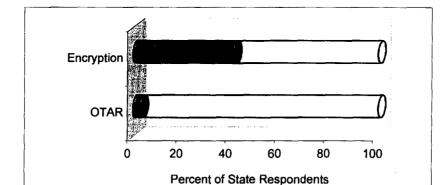
- The cost study activity grouped the types of mobile radios into three categories: basic, mid-range, and high-end
 - Descriptions of these three categories are included on page IV-6
- Approximately two-thirds of all state respondents indicate that they use high-end mobile radios
 - Only a small percentage (6%) or respondents radios are classified as basic
 - State respondents appear to operate significantly lower percentage of mid-range mobile radios than their local counterparts
- The mission of responding state agencies appears to have a dramatic effect on the level of sophistication of their mobile radios
 - Over 85% of state law enforcement agencies indicate that they operate high-end mobile radios
 - Only about 1% of state departments of public safety indicate that they operate high-end mobile radios; instead, the majority (92.1%) report using mid-range mobiles
 - Emergency management agencies have a more even distribution of radio types, although they appear to use more mid-range mobile radios

Note: A chart showing the types of portable radios used by mission is included in Appendix E

OVER THE AIR REKEYING (OTAR) AND ENCRYPTION ON MOBILE RADIOS (STATE RESPONDENTS)







HIGH-END MOBILES

State Agencies' User Equipment Information... Mobile Radio Security...

RESPONDING STATE PUBLIC SAFETY AGENCIES USE ENCRYTPTION AND OTAR IN SIMILAR PERCENTAGES ON THEIR MOBILE RADIOS AS ON THEIR PORTABLE RADIOS

- The use of encryption does not vary significantly by type of radio (basic, mid-range, high-end)
 - Over 40% of state respondents operating either basic or high-end mobile radios use encryption technology
 - A slightly lower percentage (28.8%) of mid-range mobiles are encryption capable
- State respondents appear to be in the initial stages of adding OTAR to their LMR systems
 - As a percentage, state respondents with high-end mobiles appear to use the least amount of OTAR-capable radios
 - Nearly the same percentage of state departments of public safety that report supporting encryption on their mobile radios also report using OTAR
 - Neither state emergency management or fire/EMS agencies indicate that they use OTAR on any of their mobile radios

Note: Charts comparing the use of OTAR and encryption technology by agency mission are included in Appendix E

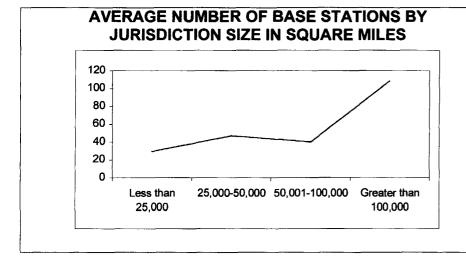
VIII. STATE AGENCIES' NETWORK EQUIPMENT INFORMATION

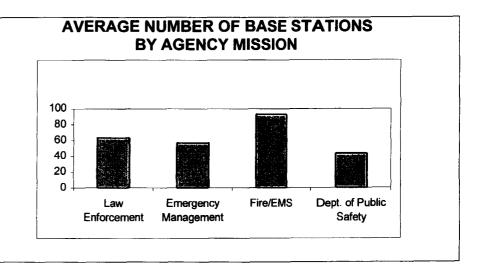
State Agencies' Network Equipment Information...

THIS SECTION SUMMARIZES STATE AGENCY RESPONDENTS' NETWORK EQUIPMENT INFORMATION

- This section covers the following information:
 - Base Stations
 - Repeaters
 - Antenna Towers
 - Dispatch and Control
 - Automatic Vehicle Locator
 - Computer Aided Dispatch
 - Network Equipment Vendors

AVERAGE NUMBER OF BASE STATIONS BY JURISDICTION SIZE AND AGENCY MISSION FOR STATE RESPONDENTS





State Agencies' Network Equipment Information... Base Stations...

OF THE STATE AGENCIES INDICATING THAT THEY OWN AT LEAST ONE BASE STATION, THE AVERAGE NUMBER OF BASE STATIONS INCREASES WITH THE SIZE OF THE STATE

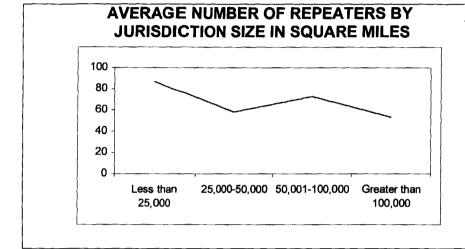
- The average number of base stations increases significantly when the state's coverage area is greater than 100,000 square miles
- The average number of base stations is relatively consistent across all state mission types
 - State fire/EMS agencies operate more base stations (over 80) on average than other state agencies
- A majority of state agencies' base stations are rack mounted

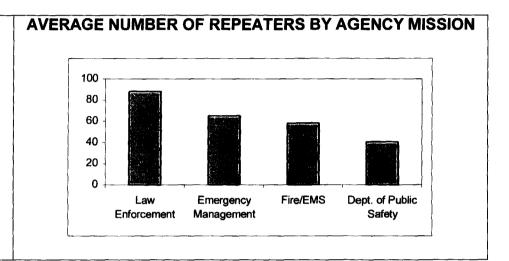
-	Cabinet mounted	36.7%
-	Rack mounted	40.8%
-	Desktop	22.5%

 Nearly equal percentages of state agencies operate low-power (under 100 watts) and mid-power (100-149 watts) base stations

-	Under 100 Watts	45.9%
-	100 – 149 Watts	46.3%
-	Greater than 150 Watts	7.8%

AVERAGE NUMBER OF REPEATERS BY JURISDICTION SIZE AND AGENCY MISSION FOR STATE RESPONDENTS





State Agencies' Network Equipment Information... Repeaters...

STATE SURVEY RESPONSES DO NOT REFLECT A CLEAR, OR CONSISTENT, CORELLATION BETWEEN THE SIZE OF THE STATE AND THE NUMBER OF REPEATERS

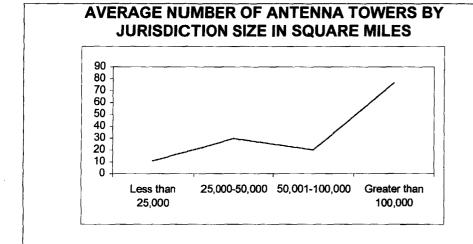
- Of the responding state agencies indicating that they own at least one repeater, the average number of repeaters tends to decrease as the size of the state increases
 - The number of repeaters does not decrease in a distinguishable linear pattern with a state's coverage area
 - The number of repeaters in small states may be inflated because the state of New Jersey has considerably more repeaters than other responding small states
- State law enforcement agencies tend to have the largest average number of repeaters while the number of repeaters for other state agencies (emergency management, fire/EMS, and department of public safety) tend to remain consistent
- State agencies indicate nearly an equal split of cabinet and rack mounted repeaters

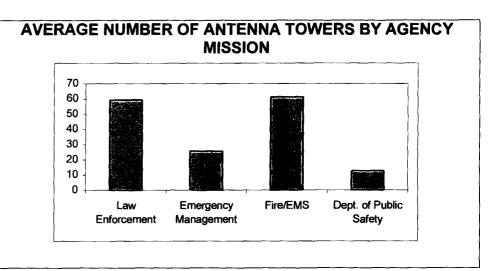
Cabinet mounted 48.8%Rack mounted 49.6%Desktop 1.6%

Most state agencies operate low-power (under 100 watts) repeaters

- Under 100 Watts 44.2% - 100 – 149 Watts 32.6% - Greater than 150 Watts 23.2%

AVERAGE NUMBER OF ANTENNA TOWERS BY JURISDICTION SIZE AND AGENCY MISSION FOR STATE RESPONDENTS





State Agencies' Network Equipment Information...Antenna Towers...

OF THE STATE AGENCIES INDICATING THAT THEY OWN AT LEAST ONE ANTENNA TOWER, THE NUMBER OF TOWERS OWNED VARIES BASED ON JURISDICTION SIZE AND AGENCY MISSION

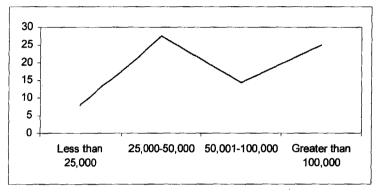
- State survey responses show a direct correlation between the number of towers and the states coverage area
- The missions of responding state agencies dramatically effects the number of towers owned
 - State law enforcement and fire/EMS agencies own nearly 60 tower on average
 - Alternatively, state emergency management agencies and departments of public safety own, on average, less then three and twenty antenna towers respectively
- A much larger percentage (48%) of state respondents than local respondents indicate that they use microwave technology to interconnect their towers
- Responding state agencies indicate that their towers are constructed in a similar manner to local agencies

	Percentage of Towers	Average Height of Towers (in feet)
Monopole	30.4%	69
Self-supported (freestanding)	67.7%	119.3
Guyed (supported by wire)	1.8%	177.3

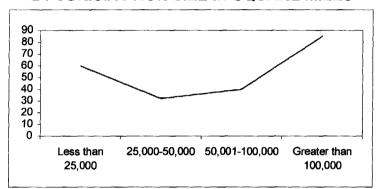
Note: Charts showing the number of antenna towers by geographic region are shown in Appendix F

AVERAGE NUMBER OF DESKTOP CONTROLLERS AND DISPATCH CONSOLES BY JURISDICTION SIZE AND MISSION TYPE FOR STATE RESPONDENTS

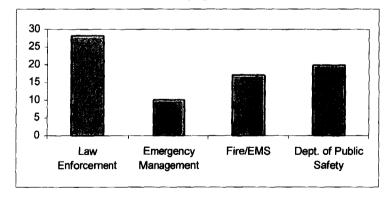
AVERAGE NUMBER OF DISPATCH CONSOLES BY JURISDICTION SIZE IN SQUARE MILES



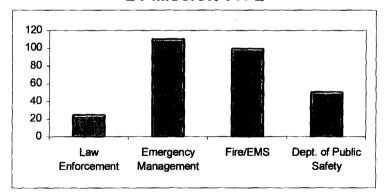
AVERAGE NUMBER OF DESKTOP CONTROLLERS BY JURISDICTION SIZE IN SQUARE MILES



AVERAGE NUMBER OF DISPATCH CONSOLES BY MISSION TYPE



AVERAGE NUMBER OF DESKTOP CONTROLLERS BY MISSION TYPE



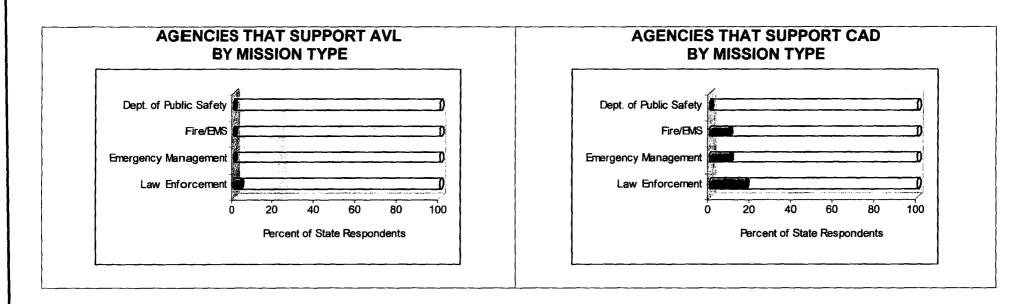
State Agencies' Network Equipment Information...Dispatch and Control...

STATE AGENCIES' MISSION AND COVERAGE AREA EFFECT THE NUMBER OF DISPATCH CONSOLES AND DESKTOP CONTROLLERS USED IN THEIR SYSTEM

- The number of dispatch consoles fluctuates with a state agencies' coverage area
 - The number of owned consoles peaks (approximately 25 consoles) for states covering 25,000-50,000 square miles
- Over 40% of state respondents' dispatch consoles control 5 channels
- State respondents indicate their consoles support more functions than local respondents
 - Over 30% report that their console supports paging-encoding, start-alert signaling, and telephone patching
 - Over 40% report that their console supports supervisory control
 - Approximately 15% report that their console supports graphical user interface (GUI)
- State emergency management and fire /EMS agencies use significantly more desktop controllers than state law enforcement and public safety departments
 - State emergency management and fire/EMS agencies report using 100 desktop controllers on average
 - Conversely, state law enforcement agencies report using approximately 20 desktop controllers on average

Note: Charts showing the number of channels and additional functions supported at the dispatch console are shown in Appendix F

AUTOMATIC VEHICLE LOCATOR AND COMPUTER AIDED DISPATCH BY MISSION TYPE FOR STATE RESPONDENTS

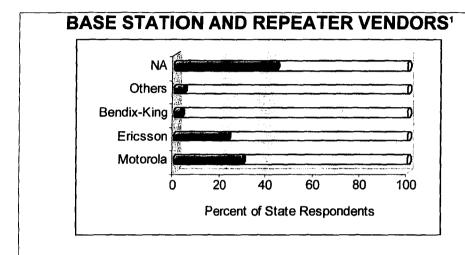


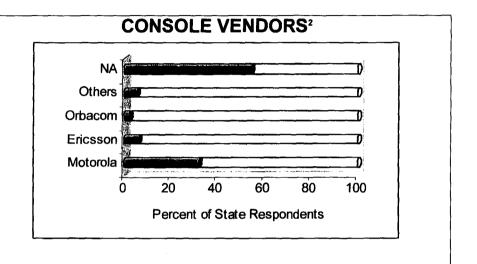
State Agencies' Network Equipment Information...AVL and CAD...

RESPONDING STATE AGENCIES DO NOT APPEAR TO BE USING ADVANCED TECHNOLOGIES TO SUPPORT THEIR DISPATCHERS

- Very few state respondents indicated use of Automatic Vehicle Locator (AVL) technology
 - State law enforcement agencies were the only respondents to report using AVL
- State law enforcement agencies are the most likely to support CAD systems

DISTRIBUTION OF BASE STATION/REPEATER AND CONSOLE VENDORS (STATE RESPONDENTS)





Note 1: "NA (Not Available)" represents those respondents who did not indicate base station/repeater vendors "Other" includes Midland, Quintron, and Tait

Note 2: "NA (Not Available)" represents those respondents who did not indicate console vendors "Other" includes Avtec, Bendlx-King, Vega, and Zetron

State Agencies' Network Equipment Information... Network Equipment Vendors...

STATE AGENCY RESPONSES, LIKE LOCAL AGENCY RESPONSES, PROVIDED LIMITED INSIGHT ABOUT NETWORK EQUIPMENT VENDORS

- State respondents did not provide as much information about their base station and repeater vendors
 - Over 40% of state respondents did not indicate the vendor for their repeaters and base stations
 - Of the state respondents that indicated base station and repeater vendors, both Motorola and Ericsson appeared to have a substantial customer base
- State responses about console vendors were as equally limited as the local responses
 - Over 50% of state respondents did not indicate the vendor for their dispatch console
 - Of the state respondents who did indicate a console vendor, Motorola again appeared to be agencies' primary vendor
 - As with local agencies, Ericsson and Orbacom also supplied dispatch consoles to state mrespondents, but neither appeared to have a significant percentage of the market
- Similar to questions about portable and mobile radio vendors, the responses to questions about network equipment vendors were optional

